

MathLab

Solving Radical Equations

Activity: Solving radical equations using various methods.

Purpose: To learn how to solve radical equations algebraically, numerically, and graphically.

Background information: Radical equations involving more than one radical can be tedious to solve algebraically. We will look at solving them in a variety of ways. A necessary skill to solving these type of equations algebraically is squaring a binomial. If you have forgotten how to do this ask your instructor for a refresher course before you begin.

Problem: Solve the radical equations $\sqrt{2x - 3} - \sqrt{x + 7} + 2 = 0$.

Algebraic Solution:

- Rewrite the equations so that the radical term $\sqrt{2x - 3}$ is isolated on one side of the equal sign.
- Square both sides of the equation. (**Be Careful:** Do not square individual terms!) Simplify completely.
- Rewrite the equation so that the remaining radical is isolated one side of the equal sign.
- Square both sides of the equation. (**Be Careful:** Do not square individual terms!) Simplify completely.
- Find the **exact** solutions to the equation. (Is one of these solutions extraneous? How can you tell?)

Numerical Solution:

- Enter the left side of the original equation as Y1.
- Modify **TABLE SETUP** as follows: TblStart = 0, Δ Tbl = 1.
- Press $\langle 2nd \rangle \langle TABLE \rangle$ to access the TABLE feature. scroll down the table until you find a value for x that makes the function equal to zero (the right side of the original equation.) Is this the same value you found algebraically?

Graphical Solution:

We have already seen in a previous MathLab that the solution to an equation is the same as the x-intercept. Let's use that fact to solve this equation.

■ If you still have the left side of the original equation entered as Y1 graph it in a standard viewing window. Follow the procedure for finding the **zero** of a function. If you have forgotten how, ask your instructor for help. What is the zero of this function? Is it the same solution that you found algebraically and numerically?

On Your Own

Solve the radical equation $\sqrt{2x + 5} - 2\sqrt{2x - 1} = 0$ algebraically, numerically, and graphically.